

---

# Determinants of Undernutrition Among Homeless Adults

LILLIAN GELBERG, MD, MSPH  
JUDITH A. STEIN, PhD  
CHARLOTTE G. NEUMANN, MD, MPH

The authors are with the University of California at Los Angeles (UCLA). Dr. Gelberg is Assistant Professor of Family Medicine, Dr. Stein is Assistant Research Psychologist, Department of Psychology, and Dr. Neumann is Professor of Community Health Sciences in the School of Public Health.

Support for this research was provided by Grant DA01070 from the National Institute on Drug Abuse of the Public Health Service and the Robert Wood Johnson Clinical Scholars Program at the West Los Angeles Veterans Affairs Medical Center and UCLA.

UCLA Medical students Gregory Albers, Fernando Alvarez, Amir Beshai, David Fischer, Daniel Garcia, and Mitchell Nishimoto collected the data. Sudha Sivaram of the UCLA School of Public Health assisted in preparing the literature review for this paper. Arm circumference tapes and skinfold calipers used in the study were donated by Ross Laboratories.

Tearsheet requests to Dr. Lillian Gelberg, Division of Family Medicine, UCLA, Room 50-071 CHS, Box 951683, Los Angeles, CA 90025-1683; tel. 310-794-6092; FAX 310-794-6097

## Synopsis .....

*Factors associated with undernutrition were investigated in a broad community-based sample of 457*

*homeless adults (344 men and 113 women) who were interviewed and examined in a variety of settings during the summer of 1985. Latent variables representing drug use, alcohol use, a stereotyped homeless appearance, mental illness, poor physical health status, and measured variables of age, sex, income, and number of free food sources were used as predictors of undernutrition. Undernutrition was indicated with three anthropometric measures (weight, triceps skinfold, and upper arm muscle area in the lowest 15th percentile) and one observational measure.*

*Thirty-three percent of the sample was undernourished as defined by at least one of the anthropometric measures. Undernutrition was significantly associated with more drug use, fewer free food sources, less income, and male sex. The findings identify persons at risk for undernutrition and suggest programs to alleviate their hunger, including increased funding for food stamps and other income supports, more free food sources such as shelters and soup lines, and drug treatment programs.*

---

**H**OMELESSNESS is a serious and growing problem in the United States today. Homeless persons are challenged daily to fulfill their basic need for food in order to survive (1-5). Their nutrition problems are of concern because protein energy malnutrition and micro-nutrient and vitamin deficiency can cause or aggravate other physical signs and symptoms (1,6-9). The homeless are an at-risk population for nutritional problems, and yet they are likely to be excluded from national health and nutrition surveys because they are not accessible with conventional sampling methods (10).

Studies report that 20 to 44 percent of the homeless are malnourished, lacking in vitamins and minerals, and 32 percent are underweight (11-14). More than one-third of homeless adults go without eating at least one day a week, and when they do eat, they eat half the amount of food recommended by the U.S. Department of Agriculture (15). Further, the diet of the homeless in general, as well as those who live in shelters and cheap hotels, often is not balanced or

of good quality (3,6,8,11,12,15-20). The low quantity or quality of meals may be due to the inability of these people to afford high-quality food (1,3,4,9,17,21) and their lack of access to cooking or food storage facilities, resulting in a reliance on ready-prepared foods, fast food restaurants (19,22), garbage cans (16,22), and a dependence on the often infrequent meal schedules of free sources of food such as emergency shelters, soup kitchens, or drop-in centers (3,16,20,22). Nearly two-thirds of soup kitchens serve only one meal a day (23). Almost half of the shelters that serve meals serve only two meals a day (23), and many serve only one meal a day (9). Given the extremely limited finances of the homeless, obtaining high-quality food may not be as important a priority as fulfilling their other overwhelming needs (for shelter and employment, for example) (22,24).

Other possible related explanations for malnutrition among the homeless are alcoholism, drug abuse, mental illness—especially severe depression—and physical illness (6,11,13,15-17,20,25). Findings on

the effect of the demographic characteristics of age, ethnicity, and length of homelessness on nutritional status have not been consistent (3,12-14). However, homeless women are more likely than homeless men to be both malnourished and obese (11,13).

Most of this research on the nutritional status of the homeless was potentially biased (17,26). First, many of the past studies were based on samples from medical clinics for the homeless (12,13,27), or from emergency shelters or soup lines (28), or cheap hotels. Only a few studies have been based on broad community-based samples of homeless persons contacted in many different settings (14-16,22). Further, with the exception of a few studies (8,11,12,19,20,22,29-31), most of the previous work on the nutritional status of the homeless has been based on self-reports rather than objective measures of undernutrition and has not included multivariate analyses.

This study fills a gap in the literature because it is designed to assess, in a multivariate fashion, factors that are independently associated with undernutrition in a broad community-based sample of homeless adults, using self-reports, observations by trained interviewers, and objective measures. Knowledge about variables that have important associations with undernutrition among the homeless would be useful for those targeting nutritional medical interventions and social service assistance to those most in need and most at risk.

## Methods

**Subjects.** In the summer of 1985, a community-based survey of 529 homeless men and women was conducted in Los Angeles County in 19 sites where homeless persons tended to congregate. These sites included emergency shelters, a parking lot, parks, a shopping mall, a large beach area, soup kitchens, food distribution centers, and job referral-social service assistance centers. To eliminate interviewer bias in sampling, every person present in each site was systematically approached. Those who met the definition of homelessness were included in the study. The definition of a homeless person was based on that of Roth and Bean, published in 1986 (32). The definition included a person who had spent the preceding night in an emergency shelter; the outdoors; any space not designed for shelter; or a hotel, motel, or home of a relative or friend and was uncertain whether he or she could continue to live there for at least the next 60 days. Moreover, the person stated that they had no permanent house or apartment to which he or she could go. The principal investigator (L.G.), a physician, and six trained medical

*'Furthermore, the finding that drug abuse was one of the major predictors of undernutrition among the homeless suggests that their nutritional problems may not be resolved while they continue to use drugs. Their nutritional problems may be compounded by their exclusion from shelter or soup line food sources while they are high on drugs.'*

students collected data in face-to-face interviews, observed mental health status, and made anthropometric assessments.

**Analyses.** To establish a model to predict undernutrition with a large set of correlated cross-sectional data, we used the technique of covariance structure modeling with latent variables. We hypothesized that physical health status, drug use, alcohol use, a stereotyped homeless appearance, mental illness, income, sex, and number of free food sources would be associated with nutritional status among homeless adults.

All latent variable analyses were performed using the EQS structural equations modeling (SEM) program (33). (See Bentler and Stein [34] for a recent review of the use of SEM in medical research.) Structural equation modeling with latent variables was chosen as the method of data analysis since we had several indicators of undernutrition and other domains of interest that no doubt suffered from some degree of measurement error. The latent variables capture the shared variance and underlying relationships among their various indicators. Latent variables are, by definition, statistically error-free constructs (34).

The model used in this study hypothesizes six latent variables—one variable that reflects nutritional status and five predictor variables possibly associated with nutritional status: drug use, alcohol use, a stereotyped homeless appearance, mental illness, and health status. In addition, we also include sex, income, age, and number of free food sources as single-item independent variables.

Initially, undernutrition was predicted by drug use, alcohol use, stereotyped homeless appearance, mental illness, age, sex, income, and free food sources. Nonsignificant regression paths and covariances were

Food sources of 457 homeless adults in Los Angeles, past week

Food source	Percent
<b>Free sources:<sup>1</sup></b>	
Soupline .....	53
Mission, shelter.....	51
Friend.....	47
Food pantry.....	34
Garbage can.....	18
Relative.....	13
<b>Number of free sources:</b>	
None.....	6
One.....	30
Two.....	28
Three.....	21
Four.....	11
Five to six.....	4
<b>Other sources:<sup>1</sup></b>	
Restaurant.....	52
Vending machine.....	20
Store.....	67

<sup>1</sup>Numbers total more than 100 percent because respondents could have used more than 1 food source during the past week.

dropped gradually until a final model emerged with no remaining nonsignificant paths.

**Latent variable measures.**

*Drug use.* Four distinct drug indicators were used; all were based on use of drugs during the previous month.

1. Use of marijuana and hashish was summed to create a cannabis indicator.
2. Use of downers, valium, codeine, demerol, librium, morphine, sleeping pills, quaaludes, and heroin was summed to create a dampeners indicator.
3. Use of speed, uppers, cocaine, ecstasy, and phencyclidine (PCP) was summed for an enhancers indicator.
4. Use of psychedelic-hallucinogenic drugs was the sum of dimethyl-tryptamine (dmt), mescaline, peyote, mushrooms, and lysergic acid diethylamide (LSD).

*Alcohol use.* Three indicators were developed that reflected frequency, quantity, and problem alcohol use (35). Frequency was assessed by two questions: whether the participant had used alcohol within the last month and how often he or she had used alcohol within the past 12 months on a 9-point scale that ranged from everyday to no use. Quantity was assessed by amount of wine, beer, and liquor usually consumed in a day. Problem use was a sum of responses to the 4-item CAGE alcoholism scale (36), reporting the "DTs," whether he or she had any

hospitalizations for alcohol problems, and whether he or she had arrests or were ever held at a police station for alcohol-related behaviors.

*Stereotyped homeless appearance.* After the interview, the interviewer subjectively rated the person on a number of characteristics often found among the homeless. Three items were used as indicators: (a) whether he or she was carrying bags of clothes or belongings (an individual item); (b) a shabby appearance due to torn or dirty clothes (2 items); and (c) a dirty appearance due to matted hair, a dirty face, dirty skin, dirty fingernails, or an unclean smell (5 items).

*Mental illness.* A number of items that were either responses to direct questions or observations by the interviewer as to the participant's mental state were subjected to factor analysis, and five distinct factors resulted.

1. Whether the person was suicidal (ideation past year or actual attempts in lifetime, or both), number of hospitalizations in mental institutions in lifetime, and whether the interviewer gave the interviewee a psychiatric referral at the end of the interview;
2. Interviewer observations of respondents' delusions of persecution, fame, grandeur, or control by others, hallucinations, and somatic hallucinations (32);
3. A 7-item self-report psychotic symptoms scale (37);
4. Observations of respondents' confusion, inappropriate affect, anxiety, and depression (32); and
5. Observations of respondents' thought disorders, perseveration, confabulation, neologisms, and poor concentration (32).

The psychometric properties of the observational measures for use with trained lay interviewers have been established previously (32).

*Poor physical health status.* Five factors emerged from self-reports and assessment by the interviewers.

1. Six self-report questions on current physical functioning (such as health limitations on working) (38) and a score by the interviewer on the normality of his or her gait;
2. Reported pain (for example, chest pain, rating of amount of pain experienced in last month);
3. Number of symptoms (39) and illnesses (40) reported by the interviewee (past month and lifetime, respectively);

4. Number of days spent lying down in the previous month due to illness; and

5. A self-rating measure (9 items) on a 4-point scale ranging from excellent to poor (41).

**Undernutrition.** Nutritional status was assessed by three anthropometric measures and one variable based on interviewer observation. The anthropometric measures of undernutrition were based on weight, triceps skinfold thickness, and upper arm circumference adjusted for age, sex, and height (42). These reference standards were developed from data collected by the National Health and Nutrition Examination Surveys (NHANES I conducted between 1971 and 1974 and NHANES II, conducted between 1976 and 1980). The three anthropometric measures indicating undernutrition were (a) weight in the lowest 15th percentile of the general population in NHANES, (b) a triceps skinfold thickness measure in the lowest 15th percentile, and (c) an upper arm muscle area in the lowest 15th percentile (42). As an added indicator, we used interviewer ratings of their appearance as emaciated, thin, or normal.

### Single indicators.

**Demographics.** We included as controls and covariates the sociodemographic variables of age, sex (females versus males), and monthly income. We tested ethnicity (white versus nonwhite), but it was not related to any of the measures of nutritional status and thus was not included.

**Sources of free food.** To assess the contribution of multiple sources of free food to nutritional status, we asked participants about the various sources of food they had used during the previous week. We constructed a single variable that was the sum of their reported reliance on various free food sources, including soup kitchens, pantries that give free groceries, missions or shelters, friends, relatives, and even garbage cans. Places requiring money, such as restaurants and vending machines, were not included.

## Results

**Sample characteristics.** For the present analysis, seven women who reported being pregnant were eliminated from the sample. In addition, those who did not reveal their age or monthly income or did not allow the anthropometric measures to be collected were also deleted. Persons refusing anthropometry did not differ from the rest of the sample on age, sex, or income. This elimination process left a total of 457

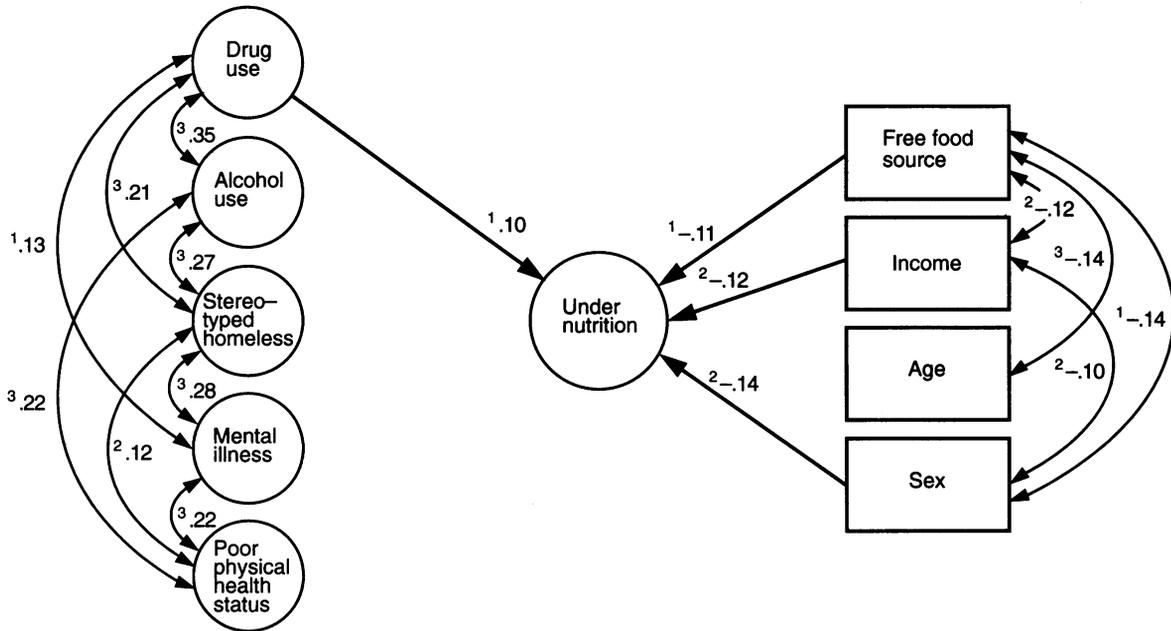
*'With respect to mental illness, despite fears about the ability of the mentally ill to take care of themselves, and findings in the literature, mental illness was not related to undernutrition. It appears that mental illness does not impair the homeless from obtaining enough food to eat.'*

participants (344 men, 113 women) ranging in age from 16 to 78 years (mean age = 34 years). The ethnic composition of the sample was 64 percent white, 25 percent African American, 6 percent Hispanic, 5 percent Native American, and less than 1 percent Asian or other.

**Undernutrition and food sources.** A greater number of persons than would be expected in the general population were undernourished as defined by the objective measures (that is, more than the 15 percent of the sample on each measure). Adjusted for age, sex, and height, 22 percent of the sample had a weight in the lowest 15th percentile of the general population, 17 percent were in the lowest 15th percentile in triceps skinfold thickness, and 21 percent were in the lowest 15th percentile in arm muscle area. Thirty-three percent of the sample (21 percent of the women, 37 percent of the men) were undernourished as defined by at least one of the objective measures. In addition, 18 percent were judged as thin or emaciated by the interviewer. Only 6 percent had weight and 4 percent triceps skinfold thickness greater than the 85th percentile of the general American population after adjusting for age, sex, and height (42).

The table lists their food sources during the past week. The most common free sources were soup kitchens, missions or shelters, or friends. Only 6 percent of the sample did not use any free food sources. The most common other food sources used during the past week included a restaurant or a store.

**Path model.** The chart presents the path model with all significant predictors included. Undernutrition was significantly predicted by more drug use, fewer free food sources, less income, and being male. Significant correlations among the latent variables, and significant covariances among the single-item independent variables are also shown. Significant correla-



<sup>1</sup>P < .05  
<sup>2</sup>P < .01  
<sup>3</sup>P < .001

NOTE: Regression coefficients are standardized. Latent variables are in circles, and measured variables are in rectangles.

tions among the latent and single-item independent variables are not shown.

## Discussion

The majority of the sample participants, regardless of the length of time that they had been homeless, were not undernourished as defined by our objective anthropometric criteria. Nevertheless, a greater proportion of homeless adults in our sample were undernourished than would have been expected among a sample in the general population (42). Undernutrition was a problem for nearly one-third of the sample of homeless adults, regardless of whether they had a stereotypical homeless appearance or evidenced symptoms of mental illness.

In terms of effective service delivery, it was very interesting that those persons who had access to and used a wide variety of free food sources such as soup kitchens, pantries that give free groceries, missions or shelters, friends, relatives, or even garbage cans, were less undernourished than those without those resources or who reported no or limited use of those sources. The quantity, quality, and accessibility of food provided in such places may be much greater than that obtained by persons who use sources where they must pay for their food. The homeless also tend

to rely on food assistance facilities in emergencies as well as a steady source of food (4). Thus, we should ensure the continued subsidization of such food programs, for without them many homeless persons would go hungry (3).

In agreement with reports in the literature (1,3,4), after controlling for other factors, we found a relationship between lower income and undernutrition, even among this sample which is already the poorest of the poor: the homeless. Despite the fact that persons with lower income are more likely to use free food sources, income itself naturally has a strong impact on homeless persons' ability to obtain enough food. This reinforces the great need for programs that will enhance homeless persons' job training, ability to get food stamps, and opportunity to overcome the obstacles to obtaining public benefits and income supports for which they are eligible at a level adequate to cover the costs of their monthly nutrition requirements (43). We would also suggest employment opportunities, vocational rehabilitation, and life skills training, which would include training in shopping and food preparation.

Furthermore, the finding that drug abuse was one of the major predictors of undernutrition among the homeless suggests that their nutritional problems may not be resolved while they continue to use drugs.

Their nutritional problems may be compounded by their exclusion from shelter or soup line food sources while they are high on drugs. This result supports prior research (6,11,13,17) and also justifies informal reports from providers of services for the homeless that drug users will spend their very limited amounts of money on drugs instead of food and many other necessities. Further, persons on drugs may not be interested in food when they are high, and they can lose many pounds during their "high" periods (the exception would be being high on cannabis). We should provide homeless drug users with vitamin and mineral supplements, as we should do for the homeless in general (6,44). And, we would recommend an increase in drug treatment programs available for the homeless, including the dually diagnosed with mental illness and drug use.

We found that sex had an important relationship to undernutrition. More homeless men than homeless women were undernourished as indicated by the objective anthropometric measures. This conflicts with findings among homeless patients—that women were more likely to be malnourished (13). In our sample, the men may have evidenced worse nutritional status because they were more likely to be drug users. The males' poorer nutritional status may have been alleviated somewhat by their significantly greater use of free food sources ( $P \leq .001$ ).

In contrast to drug use, alcohol use was not a significant predictor of undernutrition in this sample. It appears that the direct effect of alcohol on nutrition was through its relationship with other factors. Alcohol may also provide enough calories to keep a person from evidencing some of the characteristics that defined undernutrition in this study.

With respect to mental illness, despite fears about the ability of the mentally ill to take care of themselves, and findings in the literature (13,15–17,25), mental illness was not related to undernutrition. It appears that mental illness does not impair the homeless from obtaining enough food to eat.

In this sample, undernutrition is not related to poorer reported health. The people in this sample may not have had the degree of malnourishment that is necessary before physical health is severely impacted. In addition, our self-report measures of physical illness may not have been sensitive enough to detect severe levels of illness.

This study has several limitations. First, the subjects' nutritional status was defined by anthropometric measures and interviewer observations. We did not include assessments of specific signs of nutritional deficiency, measures of more severe malnourishment, dietary intake, including its quality

and quantity, nor of vitamin deficiencies. Second, since availability of food sources varies with location, our findings on the degree of undernutrition among the homeless may not be generalizable to homeless adults in other parts of Los Angeles or other parts of the United States. Third, perhaps we would have found a stronger relationship between undernutrition and poor physical health had we included objective measures of physical health such as findings from physical examinations and blood tests. However, these measures were only available for a subset of the study participants and would have lessened the representativeness of the sample. Fourth, since the path model coefficients were not large, there clearly are other important determinants of undernutrition that we did not assess in this study. We would recommend further research to discover other possible predictors of under- and malnutrition in homeless populations.

## References .....

1. Institute of Medicine: Homelessness, health, and human needs. National Academy Press, Washington, DC, 1988.
2. Hu, D. J., Covell, R. M., Morgan, J., and Arcia, J.: Health care needs for children of the recently homeless. *J Community Health* 14: 1–8 (1989).
3. Bunston, T., and Breton, M.: The eating patterns and problems of homeless women. *Women Health* 16: 43–62 (1990).
4. A status report on hunger and homelessness in America's cities: 1991—a 28-city survey. United States Conference of Mayors, Washington, DC, 1991.
5. Kinzel, D.: Self-identified health concerns of two homeless groups. *West J Nurs Res* 13: 181–194 (1991).
6. Brickner, P. W., et al., editors: Health care of homeless people: a United Fund book. Springer Publishing Co., New York, 1985.
7. Acker, P. J., Fierman, A. H., and Dreuer, B. P.: An assessment of parameters of health care and nutrition in homeless children [abstract]. *Am J Dis Child* 141: 388 (1987).
8. Drake, M. A.: The nutritional status and dietary adequacy of single, homeless women and their children in shelters. *Public Health Rep* 107: 312–319, May-June 1992.
9. Hombs, M. E.: Documents and reports. *In Contemporary world issues: American homelessness. A reference handbook*, edited by M. E. Homb. ABC-CLIO, Santa Barbara, CA, 1990, pp. 27–63.
10. Lepkowski, J. M.: Sampling the difficult-to-sample. *J Nutr* 121: 416–423 (1991).
11. Wolgemuth, J. C., Myers-Williams, C., Johnson, P., and Henseler, C.: Wasting malnutrition and inadequate nutrient intakes identified in a multiethnic homeless population. *J Am Diet Assoc* 92: 834–839 (1992).
12. Luder, E., Boey, E., Buchalter, B., and Martinez-Weber, C.: Assessment of the nutritional status of urban homeless adults. *Public Health Rep* 104: 451–45, September-October 1989.
13. Wright, J. D., and Weber, E.: Homelessness and health.

- McGraw Hill, Inc., Washington, DC, 1987.
14. Gelberg, L., Linn, L. S., and Mayer-Oakes, S. A.: Differences in health status between older and younger homeless adults. *J Am Geriatr Soc* 38: 1220-1229 (1990).
  15. Burt, M. R., and Cohen, B. E.: The characteristics and eating patterns of homeless persons who use soup kitchens and shelters. *In America's homeless: numbers, characteristics and programs that serve them*, edited by M. R. Burt and B. E. Cohen. Urban Institute Report 89-3. Urban Institute Press, Washington, DC, 1989, pp. 35-79.
  16. Koegel, P., Burnam, M. A., and Farr, R. K.: Subsistence adaptation among homeless adults in the inner city of Los Angeles. *J Social Issues* 46: 83-107 (1990).
  17. Wiecha, J. L., Dwyer, J. T., and Dunn-Strohecker, M.: Nutrition and health services needs among the homeless. *Public Health Rep* 106: 364-374, July-August 1991.
  18. Carrillo, T. E., Gilbride, J. A., and Chan, M. M.: Soup kitchen meals: an observation and nutrient analysis. *J Am Diet Assoc* 90: 989-991 (1990).
  19. Wood, D. L., Valdez, R. B., Hayashi, T., and Shen, A.: Health of homeless children and housed, poor children. *Pediatrics* 86: 858-866 (1990).
  20. Luder, E., Ceysens-Okada, E., Koren-Roth, A., and Martinez-Weber, C.: Health and nutrition survey in a group of urban homeless adults. *J Am Diet Assoc* 90: 1387-1392 (1990).
  21. Thompson, F. E., et al.: Within month variability in use of soup kitchens in New York State. *Am J Public Health* 78: 1298-1301 (1988).
  22. Gelberg, L., and Linn, L.S.: Social and physical health of homeless adults previously treated for mental health problems. *Hosp Community Psychiatry* 39: 510-516 (1988).
  23. Burt, M. R., and Cohen, B. E.: Characteristics of soup kitchens and shelters. *In America's homeless: numbers, characteristics and programs that serve them*, edited by M. R. Burt and B. E. Cohen. Urban Institute Report 89-3. Urban Institute Press, Washington, DC, 1989, pp. 81-106.
  24. Linn, L. S., and Gelberg, L.: Priority of basic needs among homeless adults. *Soc Psychiatry Psychiatr Epidemiol* 24: 23-29 (1989).
  25. Gelberg, L., and Linn, L. S.: Psychological distress among homeless adults. *J Nerv Mental Dis* 177: 291-295 (1989).
  26. Gelberg, L., and Linn, L. S.: Assessing the physical health of homeless adults. *JAMA* 262: 1973-1979, Oct. 31, 1989.
  27. Gelberg, L., Linn, L. S., Usatine, R., and Smith, M.: Health, homelessness, and poverty. *Arch Internal Med* 150: 2325-2330 (1990).
  28. Cohen, B. E., and Burt, M. R.: The homeless: chemical dependency and mental health problems. *Soc Work Res Abstracts* 26: 8-17 (1990).
  29. Miller, D. S., and Lin, E.: Children in sheltered homeless families: reported health status and use of health services. *Pediatrics* 81: 668-673 (1988).
  30. Lewis, M. R., and Meyers, A. F.: The growth and development status of homeless children entering shelters in Boston. *Public Health Rep* 104: 247-250, May-June 1989.
  31. LaComb, R. P., Taylor, M. L., and Noble, J. M.: Comparative evaluation of four microcomputer nutrient analysis software packages using 24-hour dietary recalls of homeless children. *J Am Diet Assoc* 92: 1391-1392 (1992).
  32. Roth, D., and Bean, G. J., Jr.: New perspectives on homelessness: findings from a statewide epidemiological study. *Hosp Community Psychiatry* 37: 712-719 (1986).
  33. Bentler, P. M.: EQS structural equations program manual. BMDP Statistical Software, Los Angeles, 1992.
  34. Bentler, P. M., and Stein, J. A.: Structural equation modeling in medical research. *Stat Methods Med Res* 1: 159-181 (1992).
  35. Stein, J. A., Newcomb, M. D., and Bentler, P. M.: Structure of drug use behaviors and consequences among young adults: multitrait-multimethod assessment of frequency, quantity, worksite, and problem substance use. *J Appl Psychol* 73: 595-605 (1988).
  36. Ewing, J. A.: Detecting alcoholism: the CAGE questionnaire. *JAMA* 252: 1905-1907, Oct. 12, 1984.
  37. Robins, L. N., Helzer, J. E., Croughan, J., and Ratcliff, K. S.: National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. *Arch Gen Psychiatry* 38: 381-389 (1981).
  38. Stewart, A. L., Ware, J. E., Brook, R. H., and Davies-Avery, A.: Conceptualization and measurement of health for adults in the health insurance study. Vol 2. Physical health in terms of functioning. RAND Corp., Santa Monica, CA, 1978.
  39. Shapiro, M. F., Ware, J. E., and Sherbourne, C. D.: Effects of cost sharing on seeking care for serious and minor symptoms. *Ann Intern Med* 104: 246-251 (1986).
  40. Brook, R. H., et al.: Conceptualization and measurement of health for adults in the health insurance study: Vol. VIII. Overview. RAND Corp., Santa Monica, CA, 1979.
  41. Davis, A. L., and Ware, J. E.: Measuring health perceptions in the health insurance experiment. RAND Corp., Santa Monica, CA, 1981.
  42. Frisancho, A. R.: New standards of weight and body composition by frame size and height for assessment of nutritional status of adults and the elderly. *Am J Clin Nutr* 40: 808-819, October 1984.
  43. Strasser, J. A., Damrosch, S., and Gaines, J.: Nutrition and the homeless person. *J Community Health Nurs* 8: 65-73 (1991).
  44. Winick, M.: Nutritional and vitamin deficiency states. *In Health care of homeless people: a United Hospital Fund book*, edited by P. W. Brickner, et al. Springer Publishing Co., New York, 1985, pp. 103-108.